IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of: **STORM ET AL.**	Examiner: **Andy C. LIN**
Serial No. **10/820,463**	Art Unit: **2622**
Confirmation No. **7260**	Attorney Docket No. **02EDI46752636**
Filing Date: **APRIL 8, 2004**	
For: **CALIBRATION SCHEME FOR LOGARITHMIC IMAGE SENSOR**	

PRE-APPEAL BRIEF REQUEST FOR REVIEW

Mail Stop Non-Fee Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Responsive to the final Office Action of August 21, 2008, and in connection with the Notice of Appeal filed concurrently herewith, please consider the remarks set out below.

REMARKS

Claims 11-38 remain pending in the application. Applicants maintain that the final Office Action includes clearly improper rejections based upon error(s) in facts, and/or the omission of essential elements required to establish a prima facie rejection. Favorable reconsideration is respectfully requested.

I. The Invention

The present invention (e.g. as set forth in independent Claim 11) is directed to an image sensor including an array of pixels, each pixel comprising a photodiode, a semiconductor device having a capacitance and being connected to the photodiode and operating based upon a sub-threshold for

providing a signal that is proportional to a logarithm of light intensity on the photodiode, and a calibration circuit having a capacitance and for applying a voltage having a constant rate of change across the capacitance associated with the semiconductor device and said calibration circuit for producing a constant current within the pixel.

II. The Claims are Patentable

The independent Claims 11, 20 and 30 were rejected as being obvious in view of the Kozlowski et al. reference.

Kozlowski et al. is directed to an ultra-low noise, high gain interface circuit for single-photon readout of known photodetectors from the x-ray to long IR bands at video frame rates. The Examiner specifically relied upon the differential amplifier in Fig. 6 of the Kozlowski et al. reference as allegedly meeting the claimed feature of a calibration circuit. However, Applicants maintain that the Examiner has mischaracterized the teachings of the reference in an attempt to meet the claimed feature. Indeed, there is nothing in Kozlowski et al. that refers to the differential amplifier as a calibration circuit at all.

As discussed in the background section of the present application, calibration is used in logarithmic imagers since there can be large mismatch in the gate-source voltage of a transistor that is generating the logarithmic voltage. To know or learn the mismatch, the transistor from every pixel in the array needs to be calibrated with the same current. In the circuit disclosed in Kozlowski et al. this is not possible since there is no way of isolating the photodiode from the logarithmic generating transistor. Thus, the photocurrent would corrupt any calibration current.

Furthermore, without any support in the Kozlowski et al. reference or any other cited reference, the Examiner has taken the position that it would have been obvious to use the differential amplifier in the image sensor of Kozlowski et al. as a calibration circuit for applying a voltage having a constant rate of change across the capacitance associated with the semiconductor device and for producing a constant current within the pixel. Applicants maintain that the Examiner has engaged in impermissible hindsight reasoning in the hypothetical modification of the Kozlowski et al. reference.

For example, it may be known to use a ramp voltage to generate a current, but the Examiner has not provided any teaching or reasoning that it would have been obvious to use the differential amplifier in the image sensor of Kozlowski et al. as a calibration circuit for applying such a ramp voltage, let alone a voltage having a constant rate of change across the capacitance associated with the semiconductor device and for producing a constant current within the pixel, as claimed. It is Applicants who discovered the advantages of providing such a calibration circuit in an image sensor.

Also, the Kakumoto reference is directed to an image sensor and teaches that switches are turned on to hold an image signal at a negative electrode of a capacitor, then a switch is turned on to hold a noise signal at a positive electrode of a capacitor. A switch is turned on and then a switch is turned on to combine together the image and noise signals thus held and thereby produce, as a voltage signal, a noise-free image signal at the node between the capacitor Cs and the switch MIX. Then a switch is turned on to output the noise-free image signal.

The Kakumoto image sensor also does not include a calibration circuit as claimed. Accordingly, such reference cannot make up for the deficiencies of Kozlowski et al. as discussed above. The combination of teachings of the cited references, even if obvious as alleged by the Examiner, cannot result in the invention as claimed.

There is simply no disclosure, teaching or suggestion in the cited references or in the general knowledge of those skilled in the art to provide the combination of features as claimed. Thus, the rejections under 35 U.S.C. §103(a) should be withdrawn.

III. Conclusion

In view of the foregoing remarks, it is respectfully submitted that the rejection presented by the Examiner in the final Office Action is clearly improper.

Respectfully submitted,

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